

ON TWO WELL-KNOWN BUT HITHERTO UNDESCRIBED SPECIES OF EUCALYPTUS.

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In a paper "On the occurrence of *Eucalyptus pulverulenta* in Victoria," read by Mr. A. W. Howitt, F.G.S., before the A.A.A.S. recently held in Sydney, an opinion is expressed that the *E. Stuartiana* figured and described by Baron von Mueller in his *Eucalyptographia* is a "strong variety of *E. pulverulenta*."

As I am familiar with the tree which has always been regarded in N.S.W. as *E. Stuartiana* and failed to see any connection between it and *E. pulverulenta*, I wrote Mr. Howitt stating my grounds of objection to his classification. I immediately received from him complete material of all Victorian species in dispute; specimens of timber, bark, foliage (young and mature), buds, fruits and also a quantity of leaves—enough to give sufficient oil for a chemical investigation.

From the information accompanying each it was clear that my correspondent was able to speak with confidence concerning these particular Eucalypts, for in one of his letters he states:—

"The leaves I sent were of the tree which Baron von Mueller selected and established in the *Eucalyptographia* as *Eucalyptus Stuartiana*. . . . From the specimens of foliage, timber and bark which you now have, you will see why I have dissented from the late Baron and hold that this tree should have remained as a variety of *E. pulverulenta*. . . . Taking the Victorian localities, the *E. pulverulenta* var. *lanceolata* which grows near Beechworth in Gippsland, that approaches the New South Wales sample. The *E. Stuartiana* of Baron von Mueller appears, as I have before said, about 30 miles west of Moe. The specimens which you have so kindly sent me I have not yet had time to more than inspect, but I observed that your 'Woolly-butt' (*E. Bridgesiana*, nov.sp.) is the 'Apple-tree,' 'Apple-tree Box,' or

'White Box' of Gippsland and the north-eastern districts. It seems indistinguishable from the trees which are very common in N.E. Gippsland (Snowy River). Unfortunately Baron von Mueller joined this with his *E. Stuartiana*. In my eye the two are so distinct that they should be separated, and to make the confusion worse he has attached the aboriginal (Gippsland) name 'But But' to *E. Stuartiana*, whereas it belongs to 'Woolly-butt.' "

As Mr. Howitt was a co-worker with the Baron on the Eucalypts of Victoria and so is familiar with the actual individual trees, of which the parts are described and figured in the Eucalyptographia, his remarks must necessarily carry great weight.

After much correspondence and comparing our specimens and notes, we have summarised our results as follows:—

(a) *E. pulverulenta*, Sims, does occur in Victoria, but in a lanceolate-leaf form as recorded by Mr. Howitt (A.A.A.S. 1898).

I have now to record the occurrence of this variety in N.S.W. at Barber's Creek (H. Rumsey).

(b) *E. Stuartiana*, F.v.M., as figured and described by Baron von Mueller in his Eucalyptographia, is distinct from *E. pulverulenta*, Sims, and the var. *lanceolata*, A.W.H., as well as from the New South Wales "Apple," "Apple-topped Box," "Woolly-butt," "Bastard Box" (*E. Bridgesiana*, sp.nov.) and the Victorian "But But."

The bark and timber of *E. Stuartiana*, F.v.M., very much resemble those of *E. pulverulenta*, but the young and mature leaves, buds, fruits, and oil are quite distinct.

(c) The Victorian "But But" and New South Wales "Apple," "Apple-topped Box," "Woolly-butt," "Bastard Box," are one and the same species, and, as far as we are aware, undescribed. The name *E. Bridgesiana* is now proposed for it.

(d) "Yellow Gum" is also an undescribed species. In Bentham's Flora Australiensis, Vol. iii. p. 244, under *E. Stuartiana* var. *longifolia* a brief description is given of "Yellow or Grey Gum," and "Bastard Box," (Woolles), Twofold Bay.

This variety is referred to by Dr. Woolls in his "A Contribution to the Flora of Australia," p. 230, published after the above work, and as he collected the specimens of "Yellow Gum," he would be well acquainted with this tree "of the Wingecarribee." After mentioning this and "Bastard Box," he states: "It seems highly probable that under the name of *E. Stuartiana* two distinct species are included, which hereafter must be referred to separate sections."

Mueller refers this var. (*Eucalyptographia*, Dec. 4) to *E. punctata*, but it will be shown later that it does not belong to that species.

It would appear from our deductions that three species and one variety have been included under *E. Stuartiana*.

E. BRIDGESIANA, sp. nov.

"Apple," "Apple-topped Box," "Woolly-butt," of New South Wales. "But-but" of Gippsland, Victoria.

"A tree of considerable size" (Woolls); "grows to a great height, particularly in loamy soil" (J. Manns). Bark whitish-grey, wrinkled or tessellated, short and brittle in the grain, not fibrous, almost exactly identical with the Box, *E. hemiphloia*, when freshly cut giving out an aroma similar to the ordinary oil obtained from *Eucalyptus* leaves, extending almost to the ultimate branchlets.

Young leaves in the early stage ovate-cordate and then ovate-acuminate, petiolate or sessile, opposite or alternate; in some instances (as figured) large, cordate-sessile, acuminate. Mature leaves on rather long petioles, lanceolate, acuminate, often falcate, varying in length to over a foot, not shining, the southern form drying a light grey colour, the northern a darkish green; lateral veins either prominent or faint, the intramarginal one well removed from the edge, oil-glands numerous.

Umbels capitate, axillary on flattened stalks, bearing about 7 flowers; stalklets none or from 1 to 3 or 4 lines long; tube of the calyx semiovate-obconical or top-shaped when pedicellate, only slightly attenuate at the base. Operculum hemispherical, obtuse

or acuminate. Stamens inflected in the bud, roof of ovary flat or curved. Anthers oblong, parallel, opening with longitudinal slits, connective small.

Fruits hemispherical, rarely conical, 3 to 4 lines in diameter, on a short pedicel, sessile when conical, rim mostly thickened with a ring below the edge; a specimen from Araluen has quite a flange. Valves exerted.

Hab.—VICTORIA: Gippsland ("But But," "Apple-tree," "Apple-tree Box," "White Box," A. W. Howitt, F.G.S.). N.S. WALES: Colombo ("Apple-top Box," W. Bäuerlen); Albury ("Apple," Dr. Andrews); Gerogery ("Woolly-butt," J. Manns); Rylstone ("Woolly-butt," R.T.B.); Bathurst ("Bastard Box," W. Woolls).

If this species were classified on its bark and timber alone, it would be placed between the ordinary "Box," *E. hemiphloia*, F.v.M., and "White Box," *E. albens*, but these belong to the Porantheræ division of Eucalypts, whilst the anthers of this species are parallel and open by longitudinal slits, and it therefore comes in the Parallelantheræ series.

The hemispherical-shaped fruits connect it with *E. viminalis*, Labill.; in fact it is impossible to determine the two species from fruits alone, and in one instance the young leaves of each species very similar. It differs, however, from this latter species in its timber, and particularly in its bark (not that much reliance can be placed in cortical features in working out specific distinctions), but in this case we have the only instance recorded of a Eucalyptus bark yielding an oil! This in itself is, I think, sufficient to establish its specific rank. The oil from the leaves is quite distinct in quality and quantity from *E. viminalis* oil.

I should not be surprised if the "Woolly-butt" recorded under *E. viminalis*, B.Fl. iii. p. 240, were also this species.

Unfortunately I have not been able to obtain timber and bark of *E. alba*, Reinw., but from published descriptions of that species I feel disposed to think that these two parts of the respective trees much resemble each other. The leaves of both are distinct.

As it has fruits and mature leaves similar to *E. viminalis* and probably bark and timber of *E. alba*, I place it in botanical sequence between these two species.

As the "But But" of Gippsland, Baron von Mueller included it in his *E. Stuartiana*, but his description does not apply to it, and as proved to me by the specimens and other evidence of Mr. Howitt, the Baron was not at all familiar with the Gippsland tree and described his species from trees growing at Croydon, 10 miles from Melbourne.

It differs from the Baron's *E. Stuartiana* in—(a) Its usually petiolate, ovate-acuminate young leaves; (b) its longer buds, larger and petiolate fruits, and obtuse operculum; (c) its whitish-grey oil-containing "box" bark; (d) its whitish hard timber, and habit. If bark and timber count for anything, the two trees should be separated on these characters alone

Timber.—It is a fairly hard, whitish-brown timber, but it is only good for indoor work as it decays rapidly when exposed to the air or placed in the ground. It is not used where strength and durability are required; fairly good for fuel.

Oil.—(a) *Leaves.*—646 lbs. of leaves with branchlets, distilled Feb., 1898, gave 59 ounces of oil, or an average of 571 per cent., a very satisfactory result. The oil is a little red in colour, and a few preliminary tests indicate it to be a good oil.

(b) *Bark.*—This bark has an odour when fresh, and attempts were made to extract the oil by steam distillation if possible. Two distillations of about 80 lbs. each of finely chopped and crushed bark were made and a small quantity of oil was obtained, about 2 drachms altogether. Such a small quantity of oil was difficult to collect, but about 1 drachm was obtained. It is a red oil, very fluid, with an odour little resembling Eucalyptus oil, and gives no reaction for eucalyptol in the crude condition. It could not be rectified, as the specimen was required for the Museum collection. The evidence was sufficient to decide that the odour given off by the fresh bark is traceable to the presence of an essential oil. The fact is interesting, as it is probably the only

Eucalyptus tree, as far as we are aware, that is likely to give an essential oil from its bark.

The dedication of this species is to Mr. F. Bridges, Chief Inspector of the Department of Public Instruction of this Colony, and who was the first Superintendent of Technical Education, in in which capacity he was (and even now is) most zealous in promoting the application of economic science to our indigenous vegetable products.

EUCALYPTUS PALUDOSA, sp. nov.

(*E. Stuartiana*, F.v.M., var. *longifolia*, Benth., B.Fl. iii. p. 244).
"Manna," "Yellow," "Ribbony," "Swamp," or "Flooded Gum."

A tree "not exceeding 80 feet in height" (Sir W. Macarthur), with a diameter 6 feet from the ground 1ft. 6in. to 2 feet. In the young state up to a trunk of 5 to 6 inches it is very similar to *E. viminalis*, Labill. Bark brown at the butt, bluish-white on the trunk and main branches, and yellow on the smaller branches and limbs, decorticating into long ribbons of 30 feet or more suspended from the forks and trunks of the trees.

The lower young leaves opposite, sessile, ovate-acuminate, rarely cordate; the upper ones petiolate, irregularly opposite, lanceolate, venation distinct, oil-glands numerous, coriaceous, often shining and of a yellowish-green on both sides. Mature leaves on petioles rarely exceeding an inch, lanceolate-acuminate, varying in length up to 8 or 9 inches, coriaceous, lateral veins oblique, fairly numerous and equally prominent on both sides, but in some instances scarcely visible, the intramarginal vein removed from the edge in the broader leaves, but closer in the narrower ones, slightly shining on both sides, oil-glands not numerous, drying with a yellowish tinge.

Peduncles axillary, under $\frac{1}{2}$ inch long, flattened, with 7 to 10 sessile flowers. Calyx tube 3 lines long. Operculum conical, shortly acuminate, much shorter than the calyx-tube. Stamens inflected in the bud. Anthers oblong, with parallel cells, the connective about half their length and prominent on both sides.

Ovary half the length of the bud, placenta attached to the top and bottom of the ovary.

Fruit sessile, conical, truncate, with a ring just below the rim, 3- or 4-celled, valves not exerted.

Hab.—Monga (Braidwood, *W. Bäuerlen*); Delegate (Bombala, *W. Bäuerlen*); Wingecarribee (*W. Woolls*); Hill Top (*J. H. Maiden*); Barber's Creek (*H. Rumsey*).

Under *E. Stuartiana*, F.v.M., (B.Fl. iii. p. 244) Bentham gives a variety *longifolia*, which Baron von Mueller states in his *Eucalyptographia*, Dec. 4, belongs to *E. punctata*, "Grey Gum." Now this latter species occurs throughout nearly the whole of the coastal area of this colony, and also at the same spot from which the material was obtained on which this new species is founded, and as I believe I am familiar with all the known varietal forms of *E. punctata*, I cannot admit that this species is a variety of "Grey Gum." In a paper read before the Roy. Soc. N.S.W. Vol. xxxi. 1897, by myself and colleague, Mr. H. G. Smith, "on *E. punctata*, particularly in regard to its essential oil," the systematic botany was fully treated, and I endeavoured to bring this species under one of its varietal forms but could not, as in so many of its physical properties it stood quite alone, and so I decided to give it specific rank.

In botanical sequence this species should probably come between *E. saligna*, Sm., and *E. punctata*, DC., of Baron Mueller's classification in his *Second Systematic Census of Australian Plants*, p. 90, whilst it also has affinities with *E. Gunnii*, Hk., which precedes these two species, and the *E. Stuartiana* of Mueller in his *Eucalyptographia*, 4th Decade. Its similarity to this latter species is very marked in the young and occasionally the mature leaves, and it is easy to understand how these two trees could easily be confused by working on herbarium material alone. There can be no doubt now that all future determinations of *Eucalyptus* trees must be made on a personal knowledge of the living trees, and a comparison of all their parts, products and habits, with cognate species. In this particular instance, if I had not examined the bark, wood, oil, &c., from Baron von Mueller's

E. Stuartiana, I should have considered them one and the same species, although there is a slight difference in the fruits of each; Mueller's species having exerted valves, and also a thicker rim.

It differs from *E. saligna*, Sm., in the venation and texture of its leaves, also in the shape of its fruits and constituents of its oil, but has some resemblance to it in the colour of its wood and nature of bark and its natural habitat, and these three characters also connect it with *E. punctata*, DC., the species under which it was placed by Baron von Mueller. It is, however, well removed from that species by the shape of the fruits, young leaves and its coriaceous mature leaves, which are almost devoid of oil-glands,—the oil obtained being therefore much less in quantity than that of *E. punctata*, and the quality of the oil is also much below that of "Grey Gum," which has been shown (*loc. cit.*) to surpass in quality and quantity the world-renowned *E. globulus*, Labill. "Grey Gum" timber is also more highly valued than that of "Yellow Gum."

It differs from *E. Gunnii* of Hooker, f., in Fl. Tas. i. 134, t. 27, in its larger, shining, acuminate young leaves; in its prominent venation, and coriaceous leaves; in its turbinate or conical sessile fruits, with slightly exerted valves, in the absence of a glaucousness on the fruits, branches, leaves and twigs, cider exudation, quality of timber, and constituents of its oil.

The leaves of *E. Gunnii* are eaten by stock and, therefore, classed as a fodder (Mueller, *Eucalyptographia*, Dec. 4), but the leaves of this species could not be put in this category as the volatile oil is too pronounced, as also are the tans. Some experiments were undertaken, but cattle could not be tempted to eat the leaves, preferring even bark and bones.

The "Yellow Gum" referred to by Baron von Mueller (*loc. cit.*) is without doubt this species. I have examined complete material of *E. Gunnii*, Hook. f., and "Yellow Gum" from the same locality (Bombala), and except that the young leaves of the latter are petiolate, it agrees in every other respect with the "Yellow Gum" of the Wingecarribee of Woolls and my specimens from Barber's Creek, and so is quite distinct from Hooker's *E. Gunnii*,

and I have, therefore, decided to include this southern variety of "Yellow Gum" in this species.

One is very reluctant to dissent from the Baron's classification, but his placing the "Yellow Gum" (Woolls) under *E. punctata*, DC. (*loc. cit.*), appears to me sufficient evidence that he was not quite acquainted with the characteristic differences and habits of the living trees.

Although often found growing intermixed with *E. viminalis*, yet the two species are never confused, as each has its own distinctive facies; and they differ in the fruits, timber, and oil.

Timber.—The timber is much more difficult to season than that of *E. Gunnii*, Hook., and is also specifically heavier. It is a close-grained, hard timber of a light reddish colour, and I should consider it a much more durable timber than *E. Gunnii* or *E. viminalis*. Sir W. Macarthur states that it is "said to be good." Dr. Woolls was of opinion that it is not suitable for any purpose, but Mr. H. Rumsey, of Barber's Creek, informs me that sound logs will last 30 years in the ground. My own opinion is that if well seasoned it is a good, sound, hard, durable timber, and useful for many purposes.

Oil.—The leaves are not rich in essential oil, as 394 lbs. of leaves with terminal branchlets, distilled June, 1898, gave 15 oz., or .243 %. It is slightly red in colour, and is probably (from preliminary tests) not a good oil, and as the yield is not good it could not profitably be extracted.

EXPLANATION OF PLATES.

Eucalyptus Bridgesiana, sp. nov.

- Figs. 1-4.—Young leaves.
 Fig. 5.—Ultimate twig with peduncles.
 Fig. 6.—Section of bud
 Fig. 7.—Individual anther } enlarged.
 Fig. 8.—Peduncles with sessile buds.
 Figs. 9-12.—Various forms of fruits.

All natural size except Nos. 6 and 7.

E. paludosa, sp.nov.

- Figs. 1-2.—Young leaves.
 Fig. 3.—Ultimate twig with peduncles.
 Fig. 4.—Section of bud } enlarged.
 Fig. 6.—Anther
 Fig. 6.—Cluster and individual fruits.



DESCRIPTIONS OF SOME APPARENTLY COMMON
 AUSTRALIAN NEMATODES FOUND AT SYDNEY
 OR IN PORT JACKSON.

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(Publication deferred.)